

EXHIBIT 52

CONFIDENTIAL

Expert Analysis: Lacey R. Keller

B. Qualifications

1. I am the Managing Director for Data Mining & Analytics with Gryphon Strategies, Inc. I was hired to create and direct their data mining and analytics division. In my current role, I advise financial and law firms on leveraging data for investments and investigations.
2. Prior to founding Gryphon Strategies' Data Mining & Analytics division, I founded and directed the Research and Analytics Department for the New York State Office of the Attorney General (NYAG) from 2013 to 2017. As a result of my leadership, the NYAG became the first state attorney general's office to hire a data scientist. I grew my staff from one research assistant to seven full-time staff.
3. I have also worked in various research and analytical positions, including the research department of the Service Employees International Union (SEIU) 32BJ, the largest property services union in the country. I was also a researcher for the Global Clearinghouse and a Teaching Assistant at the New School for Social Research. As a consultant, I have been hired by and have provided pro-bono assistance to many state and federal agencies as well as nonprofits on the use of data mining and analytics in investigations.
4. The work I have done throughout my career relates directly to analysis undertaken in this report. For over six years, I have employed a data-driven approach to identifying suspicious, sometimes illegal, conduct. I have developed a specialty in compiling and analyzing disorganized and disparate data. Since 2014, I have been immersed in issues and investigations related to the opioid crisis. This analysis drew upon my unique and specialized skillset that has been developed over a decade of research and analytical experience.
5. I was often tasked with identifying instances of wrongdoing by companies. For example, while at SEIU 32BJ, I reviewed public records for data to identify wrongdoing by cleaning companies and cleaning contractors around the country. For example, through thorough research and documentation, I was able to identify a cleaning company that was creating shell companies to keep a small business cleaning contract at the Walter Reed Medical Center. SEIU 32BJ submitted this information to the General Services Administration. To the best of my knowledge, that company or its subsidiaries/affiliates lost the contract for that site.
6. My primary directive when the NYAG's office hired me was to help the office identify areas for investigation using data. Frequently, I was given a subject area to investigate without having any prior expertise in the area. I would then educate myself through research and talking with subject matter experts to allow me to help them identify new areas of investigation. I often would use public data to assist with these investigations. For instance, I combined publicly available tax assessor, mortgage records, and real estate listings to identify hundreds of land owners potentially out of compliance with the city's 421-a tax benefit program that the NYAG investigated with various settlements with landlords.

7. My work over the past decade has required me to extract, process, clean, merge, and analyze both public and confidential data, which often comes poorly formatted and from disparate locations. From these convoluted datasets, I have identified trends and outliers that have furthered investigations or prosecution.
8. For over four years, I have worked extensively on issues relevant to opioids. While at the NYAG, I developed and managed the Community Overdose Prevention (COP) Program to use data analytics to determine how best to deploy life-saving naloxone across law enforcement officers statewide. Under that program, I oversaw the collection of information related to naloxone disbursements, which jumpstarted tracking opioid overdoses more efficiently throughout the state. I used the data I collected, as well as external datasets, to deepen understanding of opioid usage in New York State. Chief among the datasets I used was the Drug Enforcement Administration (DEA) Automation of Reports and Consolidated Orders System (ARCOS) data. I continue to work with ARCOS data and have now utilized both the publicly available and confidential shipment-level ARCOS data to provide attorneys with granular analysis and support the initiatives and litigation pursued by policymakers and law enforcement.
9. I have written or co-authored numerous reports using my data analysis to advance a variety of investigations into illegal activity, many of which have been covered by national media outlets. For instance, my analysis published in a report issued by the NYAG helped reveal Airbnb's illegal activity in New York City. In addition, while at SEIU 32BJ, I authored two papers about the physical building conditions of New York City public school facilities, the second of which was widely covered by local news and prompted a city council oversight hearing to address the issues raised.
10. In my work, I have frequently received produced data in a format not initially conducive to analysis, such as productions containing PDF versions of spreadsheets or thousands of files of various formats not described in a volume of bates. In a case that settled for hundreds of millions of dollars, I supervised the team that identified and extracted information about shipments from the labeler defendant's production. Because of this analysis, my team and I were able to detect millions of improper shipments made in New York State that were then used by NYAG attorneys in court and ultimately led to the judge ordering the labeler defendant to pay almost \$250 million in damages.
11. My experience also includes processing very disorganized data produced by labeler defendants in various cases for investigations and prosecution. For a wage theft case brought by the NYAG, I was asked to identify instances of an employer "stealing time" from employees. To complete this analysis, I had to extract information from thousands of PDF employee time cards to extrapolate and identify instances of missing time. Based on my analysis, I determined that over \$500,000 in owed money to employees.
12. In my work, I supervise complicated data management and analysis. For an NYAG investigation into posting fake trades in emerging market foreign exchange currency options, I used scripts to extract relevant trade information from two years of instant message, email, and voice communications between brokers. Working with my team, I then compared that relevant

information from postings to the trade confirmations of actual completed trades brokered to determine which trades were real and which were fabricated. This analysis was relied upon to generate a criminal complaint filed by the NYAG. The firms ultimately pled guilty to one count of securities fraud.

13. I am also experienced in working with vast amounts of sensitive information. In developing the interactive dashboard on illegal gun trafficking in New York, the Attorney General's Office obtained the anonymized and the highly confidential firearms tracing data from the Bureau of Alcohol, Tobacco, Firearms and Explosives. My team and I were granted authorization from dozens of police departments to access their firearms trace data on their behalf. I transformed that data into an interactive tool used by New York State law enforcement agencies to identify potential firearms trafficking, based on analytics relevant to firearms trafficking. This data required considerable cleaning and analysis, including geocoding and entity resolution to identify the same firearm purchaser that relied on different aliases, addresses, and other biographical information to avoid detection.
14. I frequently am called upon to analyze very large data. While working on investigations of broadband internet investigations at the NYAG, I collected public speed test data and submissions to office made by the general public about the download speed. This preliminary analysis was the basis for opening an investigation into the practices of the largest broadband providers regarding the internet speeds of its customers. As part of this investigation, I drafted the data request to broadband providers for account and other relevant information that would impact a customer's internet speed. I connected several datasets totaling hundreds of millions of records, including the customer account data (what internet tier they were provisioned), the internet speed test results, as well as information about the modem/router configuration. The results of my analysis and the analysis that I supervised were used in the complaint the Attorney General filed against Time Warner Cable. The case ultimately settled for \$174.2 million.
15. I received the NYAG's Innovation in Law Enforcement Award for my work on gun trafficking and twice received the NYAG's Superior Service Award.
16. I was a member of the 28th Class of Coro's Leadership New York and was part of City and State's 40 Under 40 Rising Stars in 2016. I serve on the Standards Review Council for the Multifamily Operating Standards Assessment & Improvement Council (MOSAIC) – a New York Benefit Corporation designed to establish fair and independent operating standards for quality of living within the multifamily housing market.
17. I hold a Master of Economics from the New School and a Bachelor of Business Administration from Washburn University.
18. I have not testified or been deposed in the last four years.
19. I was an invited speaker at the following conferences:

- a. Association of Certified Fraud Examiners (ACFE) Global Fraud Conference (forthcoming: 2019)
- b. NASAA Investment Adviser Training (2017, 2019)
- c. Association of Certified Fraud Examiners (ACFE) Law Enforcement and Government Anti-Fraud Summit (2018)
- d. PLI Hedge Fund and Private Equity Enforcement & Regulatory Developments 2018 (2018)

20. My CV is attached as Exhibit 1.

C. Remuneration

21. Gryphon is being compensated for its time and expenses. My hourly rate is \$475 per hour. Other Gryphon personnel working on this matter have billing rates of \$275 to \$375 per hour.

D. Scope of Report

22. This report focuses specifically and exclusively on manufacturers' anti-diversion and suspicious order monitoring programs. Throughout the report, I will refer to labelers and manufacturers interchangeably as the entities that create the drugs analyzed.

23. I have been asked to report the results of applying certain compliance metrics applicable to manufacturers to prescribers.

24. I have been asked to report the results of applying certain compliance metrics applicable to a manufacturer to pharmacies and physicians.

25. I have been asked to trace the orders made by distributors that were deemed peculiar by a manufacturer to the end pharmacy buyer through that manufacturer's chargeback data.

26. I have been asked to report the impact on opioid prescribing in Summit and Cuyahoga County if a small labeler had reported the activity of suspicious prescribers.

E. Summary of Opinions

27. My findings demonstrate that there were millions of prescriptions and purchases of billions of dosage units and MMEs in Cuyahoga and Summit counties that defendant manufacturers of opioids (called labelers) could have identified as being of unusual size or frequency and deviating from the normal pattern yet were unreported. I found that defendant labelers purchased external data sources (IQVIA) and maintained internal data sources (chargebacks, 867 data, sales data) that provided them with granular information regarding the entity distributing, prescribing, and purchasing their opioid products. All defendant labelers purchased IQVIA Xponent data. All of this information was sufficient to support a Suspicious Order Monitoring (SOM) program identifying problematic distributors, prescribers and pharmacies. In particular, it was and is possible using

standard data-analytic tools to determine from the data that the defendant labelers had in their possession suspicious prescribing and purchasing patterns, and to identify particular physicians and particular pharmacies with problematic prescribing patterns.

28. I found that defendant labelers purchased robust external data sources and maintained internal data sources that provided them with granular information regarding the entity distributing, prescribing, and purchasing their opioid products. This information was sufficient to support a Suspicious Order Monitoring (SOM) program identifying problematic prescribers and pharmacies. Nonetheless, defendant labelers did not implement robust monitoring programs and therefore failed to capture a substantial volume of potentially suspicious transactions.

29. Although all defendant labelers purchased IQVIA Xponent® data, each used it to monitor potential inappropriate prescribing in different ways to differing degrees. Teva and Mallinckrodt, for example, committed to regularly monitor IQVIA Xponent as agreed to with the FDA in their Risk Monitoring Plans (RMP), also known as Risk Minimization Action Plans (RiskMAP).¹ However, the details of how that data analysis would take place and what actions it would lead to was unspecified. To my knowledge only one defendant, Purdue Pharma, used IQVIA in a programmatic or algorithmic way². Implementing Purdue's calculations, however, requires additional data that has not been made available to me.

30. Furthermore, instead of using this data to develop monitoring programs, defendants used it to inform their targeted marketing efforts to prescribers and evaluate drug performance. Similarly, despite the scope and detail of the chargeback data they maintained, defendant labelers did not use that data programmatically or effectively to capture suspicious activity among end buyers.

31. To quantify the prescriptions or transactions that labelers could have readily detected were of unusual size or frequency, I applied a series of compliance metrics to each dataset. Defendant labelers and distributors originally developed all but one of these compliance metrics. Among these metrics were whether the volume prescribed or ordered was over a certain static threshold; whether a buyer significantly increased prescriptions or purchases relevant to their own histories; or how prescriptions or purchases compared to national averages for the same labeler opioid product. I then applied these compliance metrics to physicians and pharmacies to determine what suspicious activity could be detected by labelers. The last metric was derived from labeler defendants' due diligence Standard Operating Procedures documents in which companies expressed concern that pharmacies may be purchasing large quantities of controlled substances from more than one distributor as a means of staying below distributor thresholds. Manufacturers were uniquely positioned to identify end-customers' purchasing patterns and, thus, which customers were using multiple distributors.

32. In Part One of this report, I analyzed the prescribing history of physicians from a labeler's perspective. As previously noted, this analysis relied on IQVIA Xponent® data, which was often purchased by defendant labelers for marketing purposes. In fact, this dataset was produced

¹TEVA_CHI_00049296, MNK-T1_0007204156

² PDD1503450011

through discovery to plaintiffs by one of the defendant labelers.³ By using these compliance metrics, I demonstrated that defendant labelers did not detect millions of prescriptions that could have signaled irregular prescribing patterns. In some cases, labelers even targeted these high-volume prescribers for prescriptions of their product instead of reporting their prescribing patterns as suspect.⁴ I found several examples of high opioid-prescribing physicians whose suspicious prescribing could have been evident but, to the best of my knowledge, were not reported by defendant labelers.

33. Part Two of this report analyzed chargeback data. Chargebacks are requests submitted by distributors to labelers to protect distributors from profit loss when drugs are sold to a buyer at less than the distributor paid the labeler for them.⁵ Order information – including drug, dosage, package quantity – is contained in the request to demonstrate to the labeler that the opioid product was sold for a lesser value to an end buyer, such as a pharmacy. Because of this system, defendant labelers regularly received chargeback requests from distributors regarding purchases of specific national drug code (NDC) products. This gave the labelers access to information regarding the purchasing patterns of their downstream customers. With this data, I demonstrated that labelers had precise insight into pharmacies in Summit and Cuyahoga that were ordering excessive amounts of their opioid products. Using chargeback data alone, labelers could have detected the suspicious activity of pharmacies, and had they reported them, they would have stopped hundreds of millions of dosage units from being dispensed in Summit and Cuyahoga counties.

34. I was asked by plaintiffs' counsel to include additional analysis that examined what would have happened if a labeler with a comparatively small market share had reported and stopped supplies to suspicious prescribers. I demonstrated that if Janssen – the defendant labeler with the second smallest market share in Summit and Cuyahoga counties – had reported suspicious activity, prescriptions for millions of dosage units could have been stopped in Summit and Cuyahoga counties.

35. The results of my analysis are stark: had the defendant labelers applied similar analytic techniques using their own compliance metrics, that analysis would have identified suspicious orders in Cuyahoga and Summit counties responsible for millions of opioid prescriptions and billions of MMEs, as shown below in Tables 8 through 11. In the aggregate, suspicious orders that defendant labelers could have identified, but apparently did not, were responsible for *more than* half of all opioid prescriptions filled in Summit and Cuyahoga Counties in the periods 1997-2006 and 2008-2017, and for nearly half the MMEs dispensed there in that same period. My analysis also shows that closer analysis of the flagged prescriptions would have confirmed that multiple, identified doctors in Summit and Cuyahoga counties, not limited to those profiled in this report, were engaged in highly suspicious and likely improper prescribing. Similar, closer analysis of flagged pharmacies would have identified specific, identified highly problematic pharmacies. This analysis shows that it is and was possible to identify by name the problematic doctors and

³ ALLERGAN_MDL_02485011

⁴ MNK-T1_0001029479

⁵ PPLP004397849

pharmacies in Summit and Cuyahoga counties in this period. Using the defendant labelers' own metrics, it was not at all difficult to identify where opioids were being used problematically and where diversion was a concern. Labelers just needed to look.

F. Materials Reviewed

36. The following documents and data were considered for this report. The staff that worked under my direction had full and complete access to the documents and data produced in this case. They were as follows:

- a. Automation of Reports and Consolidated Orders System (ARCOS) electronic data, received from the DEA and processed by Securities Litigation and Consulting Group, Inc. (SLCG) on or about April 5th, 2019;⁶
- b. IQVIA (formerly Quintiles and IMS Health, Inc.) Xponent® data produced to plaintiffs' counsel through ALLERGAN_MDL_02485011 for years 1997-2006, 2008-2017 (there was no data file for 2007);
- c. Chargeback and/or 867 data data from all defendant labelers through thousands of files in different formats (e.g., .csv, .txt, .xlsx, .pdf). The Bates stamps for reviewed documents are shown below by labeler, is shown in the table below;

Figure 1 Bates Numbers of Defendant Labeler Data

Labeler Name	Data Source
ENDO	ENDO_DATA-OPIOID_MDL-00000042; ENDO_DATA-OPIOID_MDL-00000044 - ENDO_DATA-OPIOID_MDL-00000084
PAR	PAR_OPIOID_MDL_0001596821 - PAR_OPIOID_MDL_0001596826
QUALITEST	PAR_OPIOID_MDL_0002016651 - PAR_OPIOID_MDL_0002016659; PAR_OPIOID_MDL_0002016661 - PAR_OPIOID_MDL_0002016726
JANSSEN	JAN-MS-03108830 ⁷
MALLINCKRODT	MNK-T1_0007965587 - MNK-T1_0007965588
PURDUE	PPLP004418578 - PPLP004422062; PPLP004422064 - PPLP004422150
ACTAVIS	ACQUIRED_ACTAVIS_02001522; ACQUIRED_ACTAVIS_01996164 - ACQUIRED_ACTAVIS_01996173
ALLERGAN	ALLERGAN_MDL_03303052_001; ALLERGAN_MDL_03255576_0002; ALLERGAN_MDL_03255576_0005; ALLERGAN_MDL_03255576_0008; ALLERGAN_MDL_03729472
TEVA	TEVA_MDL_A_02401118; TEVA_MDL_A_02416193 - TEVA_MDL_A_02416204; TEVA_MDL_A_02419960; TEVA_MDL_A_02419961; TEVA_MDL_A_02419963- TEVA_MDL_A_02419969; TEVA_MDL_A_08637273-TEVA_MDL_A_08637277
INSYS ⁸	INSYS-MDL-015002410

- d. Peculiar transactions data produced by Mallinckrodt Inc to plaintiffs' counsel through MNK-T1_0008592627 for years 2003, 2005-2017 (there was no data for 2004);
- e. "National Drug Code Dictionary," Drug Enforcement Administration, November 2018 (current version available at www.deadiversion.usdoj.gov/arcos/ndc/ndcfile.txt);
- f. "NDC Dictionary Instructions," Drug Enforcement Administration, October 2010 (current version available at www.deadiversion.usdoj.gov/arcos/ndc/readme.txt);

⁶ McCann, Craig J. *National Prescription Opiate Litigation*. MDL No. 2804. 17-MD-2804. 2019.

⁷ Janssen only produced chargeback data for Duragesic and Nucynta for Ohio for years covering 2009 through 2018.

⁸ INSYS produced slightly more than 400 lines of data for the entire state of Ohio for 2014 through 2018.